

ABSTRACT

A method and apparatus is provided for directing an optical beam by a movable optical element and especially in a free space optical switch. The control element (5) comprises a movable member (10) including an optical element such as a mirror (30) fixedly attached thereto and supported for movement by a fixed member (40). A magnetic element (50) is fixedly attached to the movable member (10) and a magnetically permeable stator element (70) is provided fixedly attached to the fixed member (40). The stator element (70) and the magnetic element (50) mutually generate a magnetic traction force between them for substantially holding the movable member (10) in a stationary position during periods when it is not moving. The stator element (70) is provided with current coils (60) wound around portions thereof and connected with a current driver (400) for providing a controlled current in the stator coils. The current in the coils is provided to induce an electromagnetic force in the stator element (70). The electromagnetic force induced in the stator elements acts upon the magnetic element (50) attached to the moving member (10) to move the moving member in a pattern dictated by the electromagnetic force generated by the stator element (70).